"Nutrition" Number.

2-DEC 1941

A Journal Devoted to Healthful Living

HEALTH

ESTD. JAN. 1923

Edited by Dr. U. Rama Rau & U Krishna Rau M.B.B.S.

Annual Subscription: Rs. 2. Foreign—Rs. 3. Post paid.

Editorial and Publishing Offices:—

323-24, Thambu Chetty Street, George Town, Madras.

Vol. XIX. | DECEMBER, 1941. | No. 12.

EDITORIAL

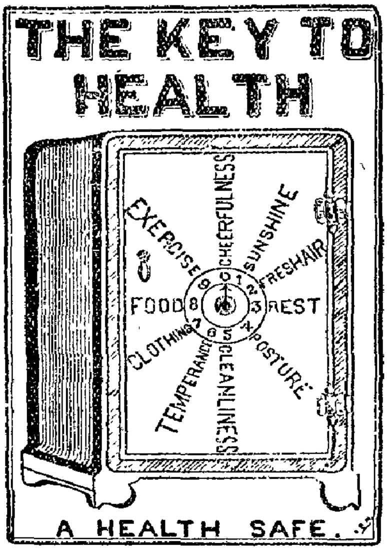
DIET FOR BODY AND MIND

Though it is generally accepted that the purpose of diet is to transform not only into the body but into its energy to act, the average man seems not bothered about how mind is formed. Various constituents of diet go to form different parts of the body, the subtler the subtle and the grosser the gross. The subtlest of body is mind and the grossest of mind is body. That these two are, after all, two sides of the same coin, is evident from the fact that both of them grow or decay simultaneously in the varying process of life. At birth, both are undeveloped and invalid. As more and more food is consumed, the various parts and functions of body develop and manifest more and more, of course, together with mental faculties also. And again, with every mental depression or shock, body is affected and with every bodily disease or injury mind gets out of order. If one ceases to take food, along with his body, mind also loses its energy to function. All this clearly shows that diet nourishes not only body but even mind and that the subtlest constituents of diet go to constitute the body of mind. Hence, whenever we talk of balanced diet, let us not forget that it should contain something for mind also.

That something must be good in the sense that it must enable the eater to keep the mind under his control; for, self-control constitutes health. Diets that make mind either too independent or too dependent or unnatural and abnormal in its functions should be strenuously avoided. Natural food, for instance, makes natural mind. The most natural and important thing that takes place before any food finally forms the body or mind is its digestion. Digestion is a process of cooking. In fact, heat is the factor that transforms the gross into the subtle. Any such transformation may be called cooking. The heat of the sun is regularly cooking all organic matter, and burning all the inorganic — the only difference

between cooking and burning being the presence or absence of water along with their objects.

All food is organic matter such as plants. The growth of them means that they have already been cooked by Nature. If man can digest them in that stage, it is, of course, better to eat them as they are. But we should not be blind to the fact that the average man of all times has a delicate stomach and is liable to become an easy victim to diseases. Hence, a further cooking is resorted to. in order to make the food easily digestible. But this further cooking must be as natural as it can be. It must be cooked with natural fire and water in earthen pots. The diet which has undergone an indirect cooking at the hands of or in the body of another animal always incurs the nature of the cook and influences the eater also similarly. This is explained in the following.



A HEALTH SAFE.

The only food and the natural food of all moving animals is, in fact, only the vegetable kingdom. It is only this that is eaten directly or indirectly by all moving animals. The tiger, in eating the vegetarian deer, is eating the vegetable but already cooked in the body of the latter. That is, instead of eating the grass directly, the weak-stomached tiger has the natural food cooked in the strong stomach of the deer and when it becomes the delicious flesh and blood of the deer, he falls on it, the ready-made food. The food, curiously enough, not only fills the belly of the deer first, but that of the tiger also, but only with the worst happening to the former, of course. But a human being knows more about cooking. He knows that the food can be cooked in vessels with the help of fire and water. Once discovered, it is nothing but the folly of man that is responsible for giving up such a harmless and most scientific method of cooking and preparing food, and waiting for innocent animals to cook his food in their stomachs only to give it to him at the risk of their lives.

But, such unnatural food may be taken only on dire necessity, as in in the case of those living in countries where grains and vegetables worthy of men do not grow. But in the midst of plenty of vegetables and grains in such tropical countries as India, one may safely choose to lead a vegetarian life in preference to flesh eating. For, vegetarian food keeps the mind and body under control, while the other makes the body dominate over the mind.

Whichever may be the right food, vegetarian or other, the fact must be admitted that to a great majority of men, non-vegetarian food has become irresistible and it must be granted that it is their proper food. But, then, there must be discrimination in choosing different animals, because all animals are not equally healthy as food, the purpose of discrimination being not only to take healthy food but to give preference to mind over the body so that, the food, though non-vegetarian, may go to make an obedient and intelligent mind. Similarly, the vegetarians also should have some principles of selection among the

vegetables they eat, while such as alcohol should be avoided and milk taken by one and all always.

So much for the diet for the body What about the diet for the mind? is a pertinent question. Just as there is food for the body, there must be food for the mind too.The relation between the physical food and the body gives us a clue to find out the suitable food for the mind. The food for the body builds it and supplies with energy to do its function namely *acting*. Similarly, the food for the mind must be that which builds and gives it the power to do its function *viz., thinking* and *knowing*.

It is not the sense organs that enable the mind of man to *think* or *know*. Every other animal has senses, and yet knows not even a small fraction of what human child of 3 years does. Therefore,to cut it short,it is *words* and *sentences*, heard and understood, that build the mind and make it *think* and *know*. Man without spoken language is no man at all. Once he begins to understand spoken language he builds his mind and this food, in a reciprocal way, has its own effects on the body, as the food for the body influences the mind. Hence, as we eat such food for the body as would have no evil effect on the mind, we must also select only such food for the mind as would have no adverse effect on the body.

Instances in our daily life are not lacking to show how certain emotions and thoughts accelerate blood circulation and increase temperature. Just as occasional thoughts cause temporary disturbances in the constitution, deep and happy convictions and faiths share the responsibility of maintaining constitutional equilibrium. But such an equilibrium, physical or mental, cannot be established without exercise. Just as the body without exercise runs down its ability to function, the mind too, without exercise,loses all power of decision and becomes a victim to the attacks of the mental environment.

The exercise of mind means discussing, writing and teaching, whereas its nourishment is accomplished by reading, hearing and learning. Discussion may be with others or with one's own-self. Writing is a sort of discussion with one's ownself or introspection, as it may be called. Teaching is only relative in its scope, because it generally requires the willingness and a standard of the student. The main purpose of the exercise is to make the mind strong enough to withstand logical attacks of the mischief-mongers and self-deceivers. In fact, the study of logic must be made an integral part of health education, or general education so that the student may grow into a *full* citizen.

Any amount of learning, without the power to discuss a problem results in settling the student in a life-long indecisive disposition. Mastery over any one language first and then logic, secured, the individual may be considered to be mentally quite healthy, as well as capable of saving the weak from the domination of the strong. Once the mind becomes healthy the health of the body stands automatically secured, because, the healthy mind knows by means of introspection and discussion,what diet is healthy, and what is not, for the body. It is not therefore a surprise that the ancient Indians had it a compulsory course of syllabus to make a complete study of *Pada*, *Vakya* and *Pramana*, before the specialisation of any particular subject. The words literally mean, respectively, the study of 'words', 'sentences' and 'sources of knowledge'. The study of words and sentences means the study of grammar and literature, and that of the sources of knowledge means, logic. None was considered educated unless he became a *Pada-Vakya-Pramana-Jna*, which means the master of literature and logic. What else does a body want than such a mind to guide it through the turbulent path of life-journey?

Such a well-nourished and well built mind is essential for a proper and a balanced diet, because a balanced diet means that diet which nourishes both body and mind. It is easy for one to machanically nourish his body with advertised balanced diet, neglecting the mind,but, however perfect it may be, the diet remains fundamentally defective. It is just like constructing a machine perfectly, without caring to see whether the employed driver is really qualified to be in charge of it. Similarly, if the mind, the in-charge of body, is well nourished and trained, there will be practically no difficulty in nourishing the latter with the best of the available food stuffs. For, everybody should depend, for nourishment, either on his own mind, or the minds of others. Everybody looks for a person who is an authority on nutrition for guidance, but the solicitor may not be even capable of understanding or deciding to rely upon the authority. If, on the other hand,one has a developed mind, he can either decide a diet for himself, or select proper authority on nutrition to be followed.

FOOD and its relation to HEALTH

By DR. R. L. SONI, M.B., B.S., F.R.H.S.,
Soni Clinic, Paungde, Burma.

IF we review the history of mankind, we make out that the problems connected with the acquisition of food played a dominant role in shaping the trend of events. Whether we cast our gaze at those far off misty days, when our very remote ancestors lived as animals, hunting after food, or when we look back to a later period when they mainly reared their flocks and grew the crops, or to still later times when they had organised into social groups and devised some table of manners, or when we look up even to modern industrialised period with our high class technique of prandial etiquette, we find throughout all these ages mankind threaded together by one common unmistakable urge for action the problem of the belly, the way and means to appease hunger. It was food that urged our Aryan ancestors to move from their home in Central Asia to various places, where they established centres of culture and civilisation and made history. It was for spices and cloves that European nations travelled eastwards and founded modern empires; it was food that made man toil hard and initiate progress. Also, unfortunately, many a great war seek their excuse in food. Thus, historically viewed, food played a dominant role.

Now, let us turn to the **relation which food bears to the individual.** We find that a good part of our time is occupied in earning our food. Whether as a doctor or a pleader,a teacher or a priest, a politician, a statesman or a ruler, a writer, a labourer or a beggar or even a film worker, we all of us work primarily for our stomach. The call of ambition, family, society or religion all come next. The first god of man is his stomach ; a hungry stomach knows no other god. We may learn to control our sex urge, we may be able to control our feelings and emotions, but to hunger, we are a veritable slave, and behave still mostly like animals. Owen Meredith has well said :

"We may live without books
 What is knowledge but grieving ?
We may live without hope
 What is hope but deceiving ?
We may live without love
 What is passion but pining ?
But where is the man
 who can live without dining ?

---

* A paper read before the Paungde Literary Society of Burma, on 25th Oct. '41 and specially sent to 'Health' for publication.

That is why we all toil so feverishly to appease the dictates of stomach.

We see people working very hard, in the office or in the field,plying their pen or their plough, but it is a pity when the time comes to enjoy their food—the result of their hard labour —they give it a reckless treat. True, they earn their food well, but, unfortunately, the majority of them rarely eat it equally well. They only know that they should earn their food in a legitimate way and that they mostly do successfully in their own way, but they rarely give thought to the idea as to how far they are successfully using their hard-earned food to do the very best it can do for them. Food bears such a profound relation to health, longevity, efficiency in work and the very enjoyment of life, that it behoves all of us to understand as to how we can derive the best we can out of it. The aim of food is to maintain the structural integrity and functional efficiency of the body, and we have to understand, how it can be achieved.

The modern conception of health is not what it used to be in the near past. A very heavy and fat person who wins in a tug-of-war by mere virtue of his weight, or a person loaded with muscles, cannot, in the modern sense, be really called the ideal of health for an average person. Such persons are merely professional athletes or physical culturists of misguided type, and most of them do not possess an all-round health. Health, in the modern sense, signifies efficiency in work and play, strength to endure, capacity to resist disease, and vivacity enough to enjoy the normal functions of life, within resonable limits, without exhaustion. Such a standard of health presupposes an upright bearing,strong bones upholstered with a reasonable amount of flesh and fat, an efficient heart at the head of an active circulation, a pair of active lungs efficient enough to ventilate and vivify the precious red fluid of the body, a clean and efficient apparatus to receive and digest food, regular and efficient drainage of waste materials through bowels, kidneys and skin, a nervous system assisted by a set of internal glands in efficient and active touch with all activities in all parts of the body, and,above all, a balanced mind capable of regulating, surpervising and improving all voluntary activities of the body. Such a complicated organisation called the body requires energy for its functions and material for its building and repair, and the source of all that energy and material is food. Thus, food is the pivot-point on which the axis of our health revolves ; this is the central pillar on which the structure of health can be built ; nay, it is the very root on which our joy of life depends.

At birth, we just weigh some where about seven pounds ; at the prime of our life, we are about 150 lbs. in weight. In other words, we grow 2100% in weight, in our journey from our cradle to our youth. Wherefrom all this tremendous bulk has come ? A moment's consideration is enough to show that we have to thank food for all this. All this increment is nothing but organised food, the food that has become part of our body. It may be mentioned here in passing that all food that becomes part of our body need not necessarily be a contribution to health. Food that is deposited as over-abundant fat is not helping health but impedes the efficiency of the body and puts extra useless strain on vital organs, thus helping to shortern life.

How to make food useful and efficient part of our body ?—That is a question that concerns us most now, and to understand it, we have to understand the e l e m e n t s of the science of nutrition, which, of late, has rightly attracted not only the attention of the research scholars and scientists, but also of food reformers, statesmen, s o c i a l workers and other enterprising individuals. In

enlightened countries, the main facts of this branch of science have become already common knowledge. This science, in brief, tell us that:—

1. Food is essential for growth of body and maintenance of health.

2. Proper choice of food can help us to grow and remain healthy.

3. Essentials of a chemically adequate diet are:—

(*a*) Energy giving foods called (i) Carbohydrates like starch, sugar, rice, wheat etc., and (ii) Fats like oil, butter, cream etc.

(*b*) Flesh builders called proteins like cheese, peas, pulses eggs, fish, meat, milk, soya beans etc.

Soya beans are a very useful addition to diet. These have rightly been termed the 'Vegetarian's meat'; while serving this purpose excellently well, these 'magic beans' in addition sufficiently round off many angularities in an otherwise qualitatively deficient diet.

(*c*) Mineral elements like Calcium, Iron, Phosphorus, Iodine, Sodium, Potassium etc.

(*d*) Fluids like water, milk etc.

(*e*) Vitamins which are essential to derive health out of consumed foods.

4. These essential ingredients, are, more or less, found in various foods in nature, but not in proportions usually needed by the human body.

5. We have to learn to be able to mix these natural foods in a way that the total needs of the body for growth and health should be well-met.

6. Different people require different proportions of essential ingredients of food in their diet, to suit the requirements of their stage of growth, mode of life and vocation.

7. The diets for different requirements and for different people are calculated with calorie as the unit. Calorie is a unit of heat required to raise 1 grm. of water through 1 degree centigrade of temperature. 1 grm. of protein is equivalent to 4 calories. 1 grm. of carbohydrate also equals 4 calories, and 1 grm. of fat is equal to 9 calories. 2400 calories are considered adequate to meet the basic needs of the body, and additional allowance of 60 to 200 calories per hour of work is to be made according as the work is light, moderate or hard. This is for the adult. The food values for expectant mothers, infants and growing children are calculated differently; the diet for the sick and ailing also requires expert considerations. Calculations are also made according to climatic conditions, weight, sex, age and height. Calculating slightly over the minimum needs of the body is beneficial to build up reserve in the system for periods of emergency, but this should not be confused with overfeeding.

8. The diet of an individual is based on the total caloric requirements for that person. The total is then split up into groups of proteins, carbohydrates and fats, and under each group the natural foods are added taking individual taste into account and till the required total is made up. Then the natural foods are divided into the usual meals of the day namely, break-fast, tiffin, lunch, afternoon refreshment and dinner which are suitably sized and spaced. Throughout this calculation, fresh foods like fruits, vegetables, milk etc. are given preference, and apart from digestibility and absorbability of foods, their roughage contents and satisfying powers are also considered.

9. However adequate the diet may be in its fresh elements and caloric total, it will fail to serve the real purpose if adequate attention is not directed towards its cooking. Bad mode of cooking may harden it to digestion or may destroy the life-giving elements in it. Even badly milled food may lead to ill-health and badly stored food to even food poisoning.

Tinned foods are not free from this risk. Roasting, frying, boiling, heating, soaking, pasteurising and steaming are some of the important modes of preparing food for eating. Wherever possible,steaming should be given preference.

On the other hand, there are certain vegetables which give their best health-value if taken in raw state. Lettuce, tomatoes, onions, cucumbers, beetroot, radish, some tender green leaves and carrots etc., are such examples. These make excellent salads. They should be washed well, cut or grated properly and served elegantly. Sprinkling of a little salt and pepper and squeezing of a little lime over them, carrots excepting, makes them more acceptable,attractive and useful.

Here, some words about *appetizers* won't be out of place. Some people appear to entertain the notion that ingredients like pickles, chutneys, masalas, excessive chillies and pepper etc.,are essential to make a meal complete. To some extent, they are not much wrong; for these things if not used habitually in excess or if used at occasions or used when the appetite fails temporarily due to worry, stress or strain, do render useful help. But, in consuming such things we should remember two points, namely that excess of such ingredients, especially when habitually used, can irritate and seriously upset digestion and that appetite dependent on such adjuncts is not a real appetite. Regular habits, healthy way of living, and open air exercise or regular walks are the natural appetisers. Also, soup as the first dish serves a good purpose, but nothing can beat the effect that results from happy, cheerful disposition at the meal hour. Science has confirmed the truth of this ancient notion by discovering that cheerfulness at meal time stimulates digestive juices to be ready to receive and digest food. Fault finding habit or discussing serious problems at that precious time antidotes appetite, and, therefore, should be relegated to other periods of the day.

(To be continued)

Eating Between Meals

The military authorities have found that mobile canteens serving tea, chocolate, and cakes, are by no means an unmixed blessing to the young troops. Snacks between meals spoil the men's appetites, so that when meal-times come round, food is pushed aside and wasted.

This is neither good discipline nor good hygiene. In view of the active open air life he leads. the soldier's appetite is naturally keen, but is adequately met by a bigger ration than that allowed the civilian. If, however, he stuffs canteen refreshments between his regular meals, the keen edge of his appetite is taken off. So the authorities concerned have wisely ordered that "the operation of mobile canteens" shall be limited to remote posts, "where the canteen service can help to overcome difficulties in supplying meals."

Wherever full and regular meals are to be had, eating between them is always a bad and wasteful habit; and any steps taken to correct such a habit, either by self-discipline or by restrictions imposed upon us by others, must surely tend to better health of both body and mind.

Between four and five hours should normally be allowed to elapse between meals, as most foods are not out of the stomach in less time. If food is taken in between the regular meals, while the stomach is dealing with only partially digested food, the intake of fresh food tends to disturb the whole process of digestion, and may set up all kinds of stomach trouble. It is quite safe to say that a large proportion of digestive troubles is caused by the snack habit between meals, which troubles either add greatly to the doctor's burdens or help to line the pockets of the patent medicine vendors.—*Good Health, (U. S. A.), June, '41.*

THE RICE RIDDLE

A MODEST SOLUTION

PART II.

(Contd. from page 255 of Nov. '41 Issue of 'Health'.)

By

R. V. Lakshmi Ratan, *Senior, Mylapore, Madras.*

Proteins in Rice.—According to McLester, the mineral constituents of grains are held chiefly in the embryo and in the outer layers of the kernel; polished rice is markedly deficient in respect of the *quality of its proteins and the quantities of its minerals and vitamins* (the italics are mine).

On page 18 of their book, *Food and the Principles of Dietetics* (eighth edition 1938), Hutchison and Mottram have stated as follows:—

> The experiments strongly support the view that for human nutrition animal proteins as a whole are more valuable than vegetable proteins. There are exceptions. Gelatin is one, and *rice* and potato *proteins are in the contrary direction* (the italics are mine).

On page 42 of his book on *Vitamins*, Ragner Berg has stated:—

> There is general agreement that in the rice grain the germ contains the highest grade and the endosperm the lowest grade protein.

Violet G. Plimmer has, in her book *Food Values at a Glance*, cited Hindhede as having found that in biological value, *the germ and bran proteins are equivalent to those of meat* (the italics are mine).

According to page 47, *Health Bulletin No. 23*, the biological value of proteins in *raw polished rice* is 80. In view of the authoritative opinions quoted above, I am sure that the biological value of the proteins in the whole rice (with the germ and bran intact) will, on investigation, be found to be very much higher.

On page 70 of their book, *The Newer Knowledge of Nutrition*, Mc Collum and Simmonds have stated as follows:—

> *Amino-acid requirement for growth*:—Osborne and co-workers (1915) made an analysis of the principal proteins of the endosperm of wheat, maize and rice kernels. They found them to yield 1.58, 0.97 and 4.26 per cent respectively of lysin. Lysin is not necessary for maintenance but is indispensable for growth. From the standpoint of practical nutrition these experimental studies all tended to focus attention upon lysin as an amino-acid of more importance than other indispensable digestion products of proteins, because it is relatively less abundant in proteins of cereal grains.

A rice diet supplemented with rice polishings, therefore, not only supplies low cost energy food but also considerable protein of high biological value.

Vitamin B_1 —According to *Health Bulletin* No. 23, the vitamin B_1 requirements of a school-going child or an adult of this country is estimated at 300 International Units per day. According to Harris and other reputed authorities:—

> *The body is unable to lay up large stores of vitamin B_1.*
>
> *It is now generally accepted that vitamin B_1 is concerned in carbohydrate metabolism, so that an increase of carbohydrate in the diet may intensify the need for vitamin B_1; and vitamin B_1 deficiency is associated with increased carbohydrate intolerance.*

To the rice eating people in general, and to the large mass of poor people in particular whose sole or main food is rice, fresh, clean, sweet rice polishings (a by-product of partially or fully polished rice), is the cheapest and a most potent source to supply the daily requirement of vitamin B_1.

Mastication and Salivary Digestion.—Saliva is necessary for the digestion

of carbohydrates. It is the first digestive secretion produced from the glands in the mouth. Saliva can only be produced in sufficient quantities by mastication, and mastication can only be secured by eating the rice (a carbohydrate food) prepared in such a manner as would provoke mastication.

The rice should therefore be prepared and eaten in as dry a state as possible. Examples of such foods in order of importance are: beaten rice (*aval*); puffed rice (*nel pori*); puffed rice made from beaten or whole rice; hoppers (*adai, dosai, iddali, appam, oothappam, etc.*) made of rice with or without green leafy and non-leafy vegetables; and *pongal* and *kichedi* conservatively cooked with or without green leafy and non-leafy vegetables. These preparations should be eaten independently, or with dry powders made of dried leaves and flavouring agents. Liquid and semi-liquid preparations should not be taken along with the rice meal. A suitable food from preparations like the above should be selected and eaten and changes from one rice preparation to another and better rice preparation gradually made, since the peculiarities of digestion and assimilation vary from one individual to another. The roasted rice preparations are spoken of highly in the ancient literature of India.

The making and supplying of fresh, sweet, crispy and tasty roasted and baked products should be one of the lines of work of the consumers' co-operative granaries, industries and stores. A special type of oven might be required for roasting and baking the products at just that degree of heat as would not affect the vitamins and other valuable nutritive constituents.

The following extracts taken from the books of reputed authors, will show to a general reader the importance of mastication and salivary digestion, and also the relation between diet and teeth.

Mc Carrison's Food.

The teeth are intended by Nature to tear and chew the food; the chewing keeps them in good exercise and healthy and strong, provided the food be of the right kind and the teeth be properly looked after. So sloppy foods and foods like curry and rice, which do not require chewing nor exercising of teeth, are likely to cause dental decay (p. 102).

When we take food into the mouth it is first thoroughly chewed and mixed with the saliva (or spittle) produced by glands near the mouth. This saliva, in addition to being a kind of antiseptic, contains a substance which starts off the process of digestion. So when we bolt our food, and do not chew it properly, we give the digestion a bad start (p. 104).

Aykroyd's Vitamins and other Dietary Essentials:

Modern civilized man is encouraged to eat in childhood soft over-cooked food—white bread, milk puddings, biscuits, and porridge etc.,—in the place of hard uncooked vegetables and fruit, and gritty unmilled cereals, which nourish children under more primitive conditions All teeth contain crevices in which food debris may be caught and cleansing is necessary to remove them. Now soft food has no cleaning action, but when food is eaten which requires a good deal of crushing and disintegration before swallowing, the tooth crevices are kept clean by frictions. Further, soft foods such as bread soaked in milk, and porridge are largely composed of carbohydrates, which, when held in the tooth crevices, become decomposed by the action of bacteria. The result is the formation of organic acids which eat away the dental enamel and give rise to caries (chapter :—Diet and teeth).

For further authoritative opinion on the importance of mastication and salivary digestion and the relation between diet and teeth, the general reader is referred to the several original articles and extracts published in the monthly journal *Health,* Madras, edited by Dr. U. Rama Rau (President, Legislative Council, Madras,) and Dr. U. Krishna Rau, M.B., B.S. Particulars of some of them are given below for ready reference:

'Why We Should Chew More?'	*Health,*	Aug. '41
'Prevention and Cure of Tooth Troubles'	,,	July 1941
'How to Eat'	,,	Sept. 1940
'Importance of Mastication'	,,	June 1940
'Tooth Decay'	,,	Oct. 1938
'Care of Teeth'	,,	June ,,
'Why Teeth Decay'	,,	,, ,,
'Teeth Ruined by Sweets'	,,	,, ,,
'Health Commandments'	,,	Apr. ,,

'OUR MOUTH AND TEETH AGAIN'	*Health* Mar. 1938	
'PHYSIOLOGICAL EFFECTS OF MASTICATION'	„ Feb. „	

Reward for Recipes.—If recipes are invited and prizes offered for preparations of roasted, baked, cooked and uncooked rice dishes and combination with other easily and locally available cheap foodstuffs, many recipes from experts in the culinary art would be forthcoming. Preparations may be made according to such recipes and judged for their whoelsomeness 'and deliciousness as well as cheapness and novelty.

An Example.—The unmilled rice prepared in a wooden grinder from a variety of paddy called *Adt. II.*, obtained from the Paddy Specialist, Coimbatore, was, on investigation in the Nutrition Research Laboratories, Coonoor, found to give the following nutritive value (pp. 44, *Health Bulletin*, No. 23, and personal communication from Dr. W. R. Aykroyd, Director, Nutrition Research, Coonoor) :—

Moisture	...	14.10 %	
Protein	...	7.20 „	
Fat	...	2.30 „	
Mineral matter	...	1.30 „	
Fibre	...	— „	
Carbohydrate	...	75.10 „	
Calcium	...	0.01 „	
Phosphorus	...	0.23 „	
Iron (Fe)	...	4.50 mgs. „	
Calorific value	...	350 per 100 gms.	about 8.75 tola weight
Vitamin B_1	...	90 International units in 100 gms.	

Figures for Vitamin B_2 group, Vitamin E. etc., are not given.

If an adult, female or male, living an ordinary life, consumes per day 15 ounces (37.5 tola weight) of whole rice or its products, from *Adt. II.* variety of paddy without washing and without wastage, and without impairing its nutritive value to any extent, the nutritive value of his or her food will be as given hereunder in *column* 1 for comparison with the desideratum given in *column 2.* (See *Health Bulletin, No. 23.*)

Comparative Study of Nutritive Values of Food.

Constituents of Food.			Food value from 15 ozs. *Adt. II.* whole rice per day. Column 1.	Against suggested requirements per day. Column 2.
Protein	gms.	...	30	55 to 65
Fat	„	...	9	45 to 60
Carbohydrate	„	...	320	400
Calcium	„	...	0.04	0.60
Phosphorus	„	...	0.98	1.00
Iron	mgs.	...	19.17	20.00
Vitamin A	International Units	...	—	3,000
Vitamin B_1	International Units	...	380	300
Vitamin C	mgs.	...	—	30 to 50
Calories		...	1490	2,100 to 2,600

The above mentioned rice diet should be supplemented with other foods to furnish *the balance requirements in protein, fat and carbohydrate; calcium, vitamin A, vitamin C, etc.* Such supplementary food stuffs should not only be cheap and plentiful, but also include such alkaline forming foods as would neutralise the excess of acid produced by the intake of acid-forming foods. These matters will be dealt with in one of my subsequent articles.

A Modest Solution.—The only hope of a solution of this all-important problem seems to lie in the application of the co-operative system to the preparation and sale of rice. The transit of the paddy from the threshing-floor to the cooking pot must be controlled by a system of granaries and stores established and controlled by the Co-operative Department all over the land. The co-operative granaries will serve as bonded warehouses for storing the local product intended for local consumption in the paddy-growing tracts or the imported paddy in

other areas. On this agency will devolve the responsibility of cleaning the paddy as described in the body of the article and husking it and polishing the rice. The quantity of paddy husked and polished in each granary must be strictly regulated according to the consumption of rice in the area served by it. Supposing that a particular granary is intended to serve 300 families which will get their supplies of fresh rice and rice-polishings twice a week from the local stores and supposing that the industrial side of the granary, as distinguished from the paddy-stocking side, works for six days in the week, the granary in question will husk and polish no more and no less than the quantity required to meet the daily average needs of 100 families

The granary will next pass on the polished rice and rice polishings to the other side of the establishment—the Co-operative Stores, which will daily issue to a third of the families served by it by strict rotation and according to a predetermined quota system their requirements of rice and rice-polishings for 2 or 3 days in the week at a time.

Freight rates have an important bearing on the problem. In order that the cost of the paddy in paddy-importing areas may not become unreasonably high, freight regulations will have to be introduced. Freight rates by rail on grain, pulses and common seeds in any form now come under one classification in I.R.C.A. Goods Tariff. Unmilled, unsplit, unwrought and unprocessed grain,pulses and common seeds must be put into a separate classification and charged lower freight rates by rail, steamer and other means of transport.

Lastly, propaganda through literature, demonstration, instruction in cookery and such other matters relating to the preparation and consumption of rice and other foodstuffs must be systematically undertaken.

References:

1. James S. Mc Lester M.D.—Nutrition and Diet in Health and Disease, 1931 Edn.
2. E. V. Mc Collum Ph. D., Sc. D., and Nina Simmonds Sc. D.—The Newer Knowledge of Nutrition, 3rd Edn., 1925.
3. Leslie Harris Ph. D., Sc.D., D.Sc.—Vitamins and Vitamin Deficiencies, vol. I 1938 Edition.
4. Sir Robert Mc Carrison.—Food.
5. Ragner Berg, Director of the Physiological Laboratory, Weisser Hirsck.—Vitamins.
6. Carleton Ellis S.B., F.C.S and Annie Louise Machod Ph. D.—Vital Factors of Foods—Vitamins and Nutrition.
7. W. R. Aykroyd M.D.—Vitamins and other Dietary Essentials.
8. Hutchison and Mottram, — Food and the Principles of Dietetics. Eighth Edition 1938.
9. Violet G. Plimmer, 1935.—Food Value at a Glance.
10. L. Nicholls M.B., B.C., B.A. (Cantab).—Tropical Nutrition and Dietetics.

Instinct for Food

If, as some would have us believe, we have an inborn instinct which is sufficient guide to tell us what food to eat, there would indeed be no need for professors and lecturers in nutrition and dietetics and infant-feeding at our universities and hospitals. In fact, as A. L. Bacharach has humorously suggested, young infants themselves might most suitably take the place of the professors, since their natural appetities are presumably the most unspoilt and unsophisticated, and they would be therefore able to point out by instinct which foods did the most good. That would be a great saving in trouble and also in expensive salaries.—"Vitamins, in theory and practice", HARRIS, LESLIE, M.D., Cambridge.——*National Health Review, Canada.*

FOOD AND NUTRITION

By HELEN S. MITCHELL, Ph.D.,
Director of Nutrition, on Staff of the Co-ordinator of Health Welfare and Related Defence Activities, Washington, D. C.

NUTRITIONAL deficiency saps vitality in so insidious a way that the victim may be unaware that enough is wrong to call a doctor. Mild degrees of nutritional deficiency, although they are neither fatal nor completely incapacitating, constitute the needs of the problem of malnutrition. They wreck courage. They undermine the will to do. They interfere with sleep so that rest is disturbed. They seriously depress to other diseases, and in women contribute to the occurrence of complications during pregnancy. The undernourished are unable to hold jobs if they find them; they become unemployable.

Malnutrition does not mean that people are necessarily hungry. They often lack appetite and hunger because of their very deficiencies. The signs of malnutrition are insidious—we can easily fail to recognise them, and blame failure to innate characteristics.

Sir John Orr, working in Scotland recently, reported that improving the diet of workmen whose diets had been below standard was "followed by increased output without any conscious effort and also by reduction in the number of accidents". Ability in the learning capacity of children has also been improved in schools both in Great Britain and the United States after introducing the School lunch.

Of all the nutrition factors now recognized, some of those grouped as the B complex vitamins are probably more crucial to the well-being and efficiency of our adult population than any others. The degree of disability induced by withdrawing thiamin (B_1) from the otherwise adequate diets of these persons was impressive. Fatigue appeared, interest in daily tasks was lost, accompanied by discouragement, depression and irritability. Appetite was lost. Multiple neurasthenic complaints were heard. The heart sounds became faint, the blood pressure fell, the pulse was irritable, and as the duration of restriction was prolonged, abnormalities in the action of the heart and the mobility of the stomach and intestine could be recorded with special apparatus.

Later studies by the same group have shown that less drastic deficiencies, intakes of 200-250 I. U. of Thiamin, may not result in abnormalities sufficient to be detected in the laboratory, but the subjects developed symptoms mentioned in the earlier experiments.

"Enriched" flour and bread have been recognised to be able to meet the need for more Thiamin, Nicotinic acid and Riboflavin—all members of the complicated B complex. "Enriched" means that Thiamin, Nicotinic acid and Iron have been added in significant amounts so that six slices of bread will furnish approximately $\frac{1}{4}$ to $\frac{1}{5}$ of a day's requirements of these factors. Families of low income eat more bread and they will derive real benefit for which reason we should all encourage the use of "enriched" flour and bread. But we must not stop there and think that enriched bread is a panacea and that it was solved all over nutrition problems. Milk, fruits and vegetables are still vitally important. Bread must come in for emphasis first, other foods should follow.—*Abridged from 'The Medical Women's Journal', pp. 151, May, '41.*

The Banana

By

DR. T.C. BASU CHOWDHARY, L.S.M.F.,

and

DR. S. MITRA, L.S.M.F.,

Agra, U. P.

In our country, various kinds of fruits are found which are very useful for our health. They are practically all seasonal and that is why our wise-people have always advised us to use plentifully the fruits of the season which are specially beneficial in that particular season in which they grow. If fruits are taken in judicial and prudent manner, they are said to purify and maintain the alkalinity of the blood. There are many fruits which contain much sugar; generally, such fruits are very nourishing. —"*C. Basu*".

Fruits are regarded as one of the most important items of breakfast meals in foreign countries but, unfortunately, we in India do not take so much care of our diet nor do we think of taking fruits so regularly as others do. In other countries, the fruits are generally sold in tins but in India we can get them always fresh which are far better, tasteful and more useful than the tinned ones. —"*P. C. Ray*".

Vitamin C—the anti-scorbutic factor—is found in natural state in fruits such as oranges, lemons, apples, bananas, tomatoes and even in milk also. Its deficiency causes some sort of scurvy and also lack of power of resistance to external organisms. Minor degrees of scurvy due to deficiency of vitamin C are not uncommon in persons who have for a long period been addicted to a diet consisting largely of tea, white bread and tinned foods. If such persons are given large amounts of fresh fruits-juice from oranges, lemons or bananas, these symptoms are rapidly alleviated. Most of the symptoms observed in human subjects have also been corroborated by animal experiments.—"*Wats and Eyles*".

The importance of vitamin C to the human economy is based on its physiologic function but exactly how it functions has not yet been determined. Apparently, it is essential for the balanced chemistry of oxidation-reduction, and in its absence certain cells cannot function properly. This hypothesis is based on the fact that cevitamic acid very readily surrenders its oxygen. Vitamin "C" is necessary for the formation of all intercellular substances having collagen as their basis; and its absence prevents the formation of the matrices of white fibrous tissue, cartilage, bone and dentine. —"*Wolbach*".

The various manifestations of a deficiency of vitamin C (cevitamic or ascorbic acid) are thus in part due to failure of endothelial cells to form cement substance. Capillary fragility is common and minor hemorrhages are also relatively not uncommon when the diet contains an iusufficient quantity of the anti-scorbutic vitamin. In the teeth and long bones, simple connective tissue is formed rather than the normal substantial dentine or bone substance, if the deficiency is severe and sufficiently prolonged.

As Wolbach puts it, vitamin C deficiency may not interfere with the growth of tissue cells but it does present or suspend the proper maturation of structural embryonic connective tissue. Thus it impairs the strength of the matrix and weakens the entire structure. This consequential impairment of the supporting mechanism explains, histologically, the anatomic abnormalities in scurvy and other conditions due to vitamin C deficiency.

There is a connection, as yet not clearly understood, between vitamin C and the adrenal (cortical) hormone. Bourne has suggested that this hormone is one of the factors associated

with clinical manifestations of scurvy and that vitamin C is intimately bound up with its synthesis.

The reduced immunologic response frequently seen in vitamin C deficiency may be the result of the body's lessened ability to form collagen, a substance which aid in segregating infectious organisms.

Therefore, it is regarded that fruits are the most important items of our food. One of the most nutritious of fruits, the BANANA, is now an accepted and welcomed ingredient of many modern breakfast meals. It is a compact, hygienic form of energy food for both children and adults of all ages, provided care is taken in its selection.

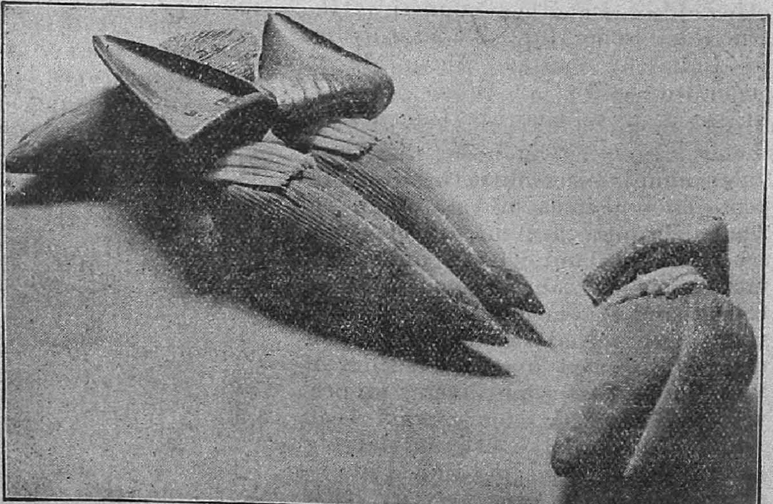
Bananas are found all over India. They grow plentifully in moist climate specially in Bengal, Madras, and Bombay Presidencies. There are many varieties. The following are a few of them :—

(1) Champak Kela. (2) Bara Kela. (3) Kath Kela. (4) Amrit Kela. (5) Mukta Kela. (6) Manikya Kela. (7) Jangali Kela. (8) Pahari Kela. (9) Martaban Kela.

As for their food value, all have got equal beneficial effects.

The tree of banana is just like a pillar. It has got different layers of covering over the solid central pillar, which is very thin in comparison to the thick trunks we see. The solid trunk is very useful for patients suffering from stones of kidneys and bladder. The leaves are very long as well as suffificiently broad. Through these leaves a conical mass protrudes which contains hundreds of small bananas. These small bananas are covered by deep red coloured leaves. These small bananas are very useful for blood purifying purposes. They have a very soothing effect in cases of gonorrhea. They have been used with advantage in cases of spermatorrhea also.

Being essentially tropical, the banana is picked "geeen" and ripened under artificial conditions. When it is tipped with green, it is only partially ripened, and requires to be cooked by baking in order to convert its difficult-to-digest starch into more easily absorbed forms of fruit or grape sugar. In China, people eat bananas generally in this way; but in India, this method is seldom adopted. In Bengal and in many other parts of India, people prepare soup of unriped bananas. This soup is given to patients also who are either suffering from intestinal troubles or have already suffered and are in a convalscent state. This is a very good, light and nourishing diet



This conical mass (Spathe of Mosae) consists of several layers of red-coloured sheaths, in between which are seen hundreds of small tender plantains.

for those patients who cannot digest anything. In cases of dysentery, it can easily and safely be given.

It is wiser to choose bananas that are "Yellow ripe," of a uniform, rich colour all over, and allow them to ripen fully in the fruit bowl in the atmosphere of the average living room, until the skin is flecked with brown spots or patches. The brown spots or patches are the indications that the banana is now fit to be taken and the greater part of the carbohydrate content exists in the form of glucose and sucrose. These are fruit sugars which are readily digested and assimilable by the system. This is the reason why bananas are prescribed so frequently by eminent physicians. This form of carbohydrate is highly energizing, and makes the banana an ideal food for the rapid metabolism and high energy needs for children. It is readily digested and therefore, it is an excellent energy food for sedentary workers in place of more slow-burning starches. It can be used in place of artificial glucose with vitamin "D" which we generally use for convalescents.

As a food, bananas are complete in themselves, in as much as, they provide sound nourishment with health protective qualities of a high order. Their vitamins and mineral matters are high in value. Their content of vitamin "A" which increases the infection resistance of the body, and of vitamin B_2 (or G) which assists digestion and pretects against pellagra, is fair, and of bone and tissue building vitamin C is good.

Bananas are richest in potassium and calcium salts, that are tonic to the body, and, having alkaline end results in cell metabolism, bananas are a safe and reliable food at all times. In it all the five proximate principles of food exist in proper order to make it an ideal food. When compared with other common fruits, it will be found that banana contains the nourishing materials far better than any other fruit which may be so cheap as to be easily procurable even by the poor.

Comparative Study of the Five Proximate Food Principles in Fruits.

Variety.	Water.	Protein.	Fat.	Carbo-hydrates.	Salts.
Orange ...	88.25	0.44	0.27	6.62	0.6
Mango ...	75.5	1.2	0.76	17.58	1.2.
Apple ...	83.5	0.39	—	7.73	0.31.
Grapes ...	74.52	5.9	—	24.36	0.53.
Banana ...	73.32	1.50	0.05	17.78	0.73.

(Figure) *"C. L. Basu"*

Banana contains :— (1) Moisture. (2) Dextrose. (3) Levulose. (4) Sucrose. (5) Starch. (6) Crude fibre. (7) Protein. (8) Fat. (9) Ash. (10) Salts.

The following salts are found in it :– (1) Calcium. (2) Potassium. (3) Sodium. (4) Sulphur. (5) Phosphorus. (6) Magnesium etc.

From the above table, it appears that banana is the best fruit because it is very cheap and it has got more efficacy than other common fruits. It has got another best quality that it readily combines with all kinds of food. Although pre-eminent at the breakfast table, it does not go amiss with the vegetable salad or as an additional vegetable with the cooked meal. It is, therefore, a very useful fruit, both ripe as well as unripe, in cases of sick people, particularly for patients suffering from digestive troubles, for children, invalids and those with weak digestion; however, it should be crushed and stirred well with a fork, to break down the cellular fibres so that the digestive juice may have easy access to the food. When it is combined with a little cream *(dhahi)* and

whole grain breakfast cereals (such as *(chivuda)* or oats or dalia*(dhalia)* the fruit has a mild laxative effect. The calorific value of the banana is high. Four good-sized bananas are equal to one pound of bread of good quality of wheat. This fuel value makes it an enjoyable substitute for more solid food in summer as it is so easily digested and released in the tissues, and in winter it is a most important addition to other food due to its carbohydrate contents. Hence, it may easily and with advantage be used in all seasons.

It increases appetite and is very palatable. It is a blood purifier and a great restorative. It is given in cases of impotency, general debility, leucorrhea, dysentery, dyspepsia, diarrhea, and even in cases of phthisis. It is prescribed both as food and also sometimes as medicine. —*"Charak"*

In cases of dyspepsia,unriped bananas are given in the form of salad or with some other vegetable preparations. It works very good in cases of dysentery. Turner is of opinion that over-ripe bananas and strawberries have been particularly useful in the treatment of sprue; over-ripe bananas (one or two as the case may be but not more than that in the beginning) should be crushed and well whipped and then some honey is added which can easily be given in cases of febrile conditions where glucose with vitamin D is prescribed. This saves much expense and also gives the patient more energy without any harmful effect.—*Medical Digest.*

COW's MILK as DIET for INFANTS

By

U. P. Basu, D.Sc., P.R.S. (Cal.),

Calcutta.

Milk, is the entire food for the newborn to live and grow on; so its dietetic value should always be enhanced *qualitatively* as well as *quantitatively* for the proper development of the health of the infants.

Clean and safe milk is what the infant requires. As milk is carrier of various diseases, it is essential to know whether it has been drawn from the clean udders of a healthy animal by the clean hands of the milker into a clean vessel. The milk should be free from pathogenic as well as non-pathogenic organisms. The custom of consuming boiled milk is quite good, as we know to-day that pasteurisation at 145°F (62.8°C) to 150°F (65.5°C) for half an hour kills the pathogenic organisms. To destroy the non-pathogenic ones, milk should be cooled to 4°C (39.2°F) just after milking. So in order that we may remain free from milk-borne infections, any milk that is to be sent to the market for sale should be bacteriologically graded. Of course, this is a tedious process; but in connection with the production "Lacto-Protein" it is,being noticed by us that the examination by 'methylene blue' test is an easy and a rapid method of grading of milk. The quality of milk, however, depends on the breed and mode of feeding. Milk is rich in easily digestible protein, highly emulsified fat, the sugar lactose, readily assimilable calcium and phosphorus, enzymes and the vitamins. No other food reinforces the diet at so many vital points. But for their constant supply the animals should be kept under proper control. The fodder must always be rich in nitrogenous and mineral substances and the animals will have to graze in good pastures during the day time. In metropolis and other large cities attention must be drawn towards the proper storage of the fodder, so that

its nutritive value may not be lowered due to hydrolysis of the protein present to amino acids by the proteolytic enzymes, by fermentation, or for some other cause. Methods are now known by which the loss of nutrient material can be minimised by closely packing the green fodder in silo after some chemical treatment.

What should be the quantitative requirements for the infants? Any food requirement is estimated in terms of heat units—calories, and this for any baby under one year is usually ascertained in terms of body weight. The following allowances are considered adequate :

Age (months)	Calories per kg. (2.2 lbs.) of body weight.
0-6	100
6-12	90

A new born baby weighing 6 lbs. would require about 270 calories and these should be secured from mother's milk. The average mother's milk yields about 18-19 calories per fluid ounce. This shows that the mother will have to yield 15 ozs. of milk daily for her child, and the requirement would gradually go up with the growth of the child. Seldom mothers are now being found to secrete the requisite amount and the consequence is the adoption of artificial feeding. Cow's milk diluted with water is the obvious choice. As the infant grows and reaches the age of 6 months, some cereals (usually barley water) are added to make up the calorie requirements. Subsequently, other carbohydrates, vegetables and even eggs are to be included in the diet. Besides these calorie requirements the baby should get some other food essentials—minerals and vitamins. But milk in spite of being an almost perfect food is often deficient in these respects. Iron, copper and vitamin C are the essentials whose requirements cannot be satisfied from the milk alone.

Miss Sita Kumari of Aryakanya Mahavidyalaya, Baroda, practising archery without the help of her hands.

Cow's milk is a good source of vitamin A; but the animals do not seem

[Page 281

to be capable of synthesizing the vitamin nor its precursor carotene. They would depend on their foods, specially succulent grass for the needed supply. This is rich in carotene which is converted to vitamin A in the system. Naturally, in cities and during winter, the milk would be much poorer in vitamin A content for want of green grass. A good milk contains about 3 International Units of vitamin A per c.c., or, in other words, a pint (570c.c.) of milk would afford, only about 1700 units. The exact requirements for infants have not yet been definitely ascertained; but children below 4 years require 3000 I.U. per day. Further, as the potency often varies and even may fall to one unit per c.c. of the milk, so the infant dietary must be enriched with some other substances rich in vitamin A. Cod liver oil of good variety may supply about 1000 I. U. per c.c.

Again, milk contains about 0.05 to 0.1 I. U of vitmin D per c.c.; when a pint would afford 28.5 to 57 units. During growth about 1000 units are being considered to be the daily requirement. In this case also, summer milk is much richer than that of winter. Here, the sunlight plays a greater role. If the fodder be exposed to sunlight, the pro-vitamin, sitosterol and ergosterol, present in the foodstuffs might be partly converted to vitamin D. Obviously, village milk would be superior to town milk. One of the cheapest source of this vitamin is to expose the body surface to sunlight; but the sun must be high up in a clear sky. The vitamin C of milk is, however, destroyed to a considerable extent during storage as well as in heating; so some fruit juice must always be given to infants to counteract this deficiency. Regarding the vitamin B complex, it may be said that during heating a part of B_1 is only destroyed but B_2 remains unaltered.

Milk is particularly deficient in iron so essential for maintaining a higher hæmoglobin level in infants from 3 to 4 months up to 2 years of their age. It has been shown that the requirement of iron is in no way being satisfied by any diet, however, adjusted. The addition of cereals to milk would not help to any extent. In this connection it may be pointed out that amongst the cereals added to the infant dietary *Sati (carcunia zeodoria)* is richest in iron content.

Attention should be directed before offering the milk food to infants regarding supply of copper, an element essential for the formation of hæmoglobin of blood. Cow's milk is also poor in its copper content and in our assay,it has been found to contain 0.19 mgm. per litre in average. The necessity of copper seems to depend on the amount of hæmoglobin present in the blood of any infant in question.

From all these it is apparent that cow's milk diet for infants should be the milk from well bred and properly fed animals, and supplemented with iron, copper, vitamin C and occasionally vitamins A and D. To meet the calorie requirements, carbohydrates are to be added and during the latter part of the first year, foodstuffs like green vegetables, eggs,etc., should be given in order to make the diet well balanced. Nowadays, artificial food, skimmed milk powder, malted milk, etc., are often being offered to infants. It should be of interest to narrate the differences existing in woman's milk, cow's milk, skimmed milk (liquid), dry milk powder and a malted milk.

Dried cow's milk is deficient in carbohydrate and rich in fat and protein in comparison with 'Malted' milk. The fat present in milk is highly emulsified (1,500,000 globules being present per pin head drop) and as such should be readily assimilable. In original milk, it is present in about 3.7% and this is further lowered when the milk is diluted with water, or barley water. The Technical Commission also recommends that milk containing 3–3.5% fat is suited for infant

feeding; 100 gms. of 'Malted' milk would afford about 415 calories. From economical point of view, it would be much inferior to cow's milk. Thus, one bottle of the former containing 14 ozs. product costs about Rs. 2-4-0; which would afford 9 seers or about 8225 gms. of milk (considering the Calcutta price at 4 seers per rupee). The malted milk would then afford us roughly 1750 calories whereas the cow's milk would supply about 5510 calories. The former is, therefore, over 3 times more costly even in Calcutta.

The main drawback in any skimmed milk product is that it is poor in vitamin A content; and the lack of this vitamin may cause eye troubles, infections of the respiratory and urinary tracts. The reason for intolerance of cow's milk may then be sought elsewhere in spite of attributing the defect either for its fat content, or, for its characteristic composition. Of course, there might be cases that possess an inherently defective system of metabolism; but often such system is created by ourselves in not supplying all the food materials essential for maintaining the daily metabolism. If milk be poor in vitamin A for one or other reason as cited above, it would not promote proper growth and appetite. A deficiency of vitamin C would bring forth a great lassitude and inhibit the formation of bone and teeth. Shortage of iron and copper would create anæmia and a slight degree of anæmia in infants markedly lowers their resistance to disease. Under all such circumstances there would be loss of appetite with consequent nutritional deficiency. This would then disturb the whole metabolism of the system and would create intolerance of common food amongst the infants. It is no wonder then that we find such a high percentage of deformed infants in our country. This is of special significance to the social and public health authorities as the health of the whole population depends mainly on infant nutrition. For this, better milk,—milk from cows kept not in wretched hovels and fed with scanty fodder, but properly reared with ensilage rich in nitrogen and minerals—with necessary adjuvants should be supplied to infants if we ever cherish to produce healthier, happier and energetic children. — *Indian Journal of Pediatrics.*

A Diet Problem— GINGELLY or SOYA BEAN?

By
R. V. Lakshmi Ratan
(Senior),
Mylapore, Madras.

DR. W. BURNS, Agricultural Commissioner with the Government of India, discusses the nutritive value and industrial uses of soya bean, prospects of extending its cultivation in this country, and other matters relating to it, in an article under the caption "The Soya bean–Its Politics, Performances and Possibilities", in the *Indian Farming* for September 1941. It is a brief review of the different aspects of the problem of soya bean in India. Persons interested in soya bean will do well to go through Dr. Burns's article. In that article, he has referred to Dr. Aykroyd's scientific evidence based on actual feeding trials both with experimental animals and human beings, which showed that the intake of soya bean had no better effect than similar amounts of common Indian pulses.

In preference to soya bean and even to pulses, it is worthwhile to examine thoroughly the nutritive value of

gingelly and its oil-cake, the possibilities of improving the quality and yield of gingelly and of extending its cultivation.

Gingelly is cultivated in India for thousands of years. There are different varieties of gingelly seeds, large and small, in white, red, yellow and other colours. Jaffa (Levant) seeds are rich in oil containing about 47 per cent. Its seed, oil and cake are already in use in this country in making food preparations. Men and cattle like its flavour, and the question of palatability does not arise in the case of gingelly products.

In Hindu households, as is well-known, gingelly is used on almost all religious and ceremonial occasions, such as *Amavasya*, *Sraddha*, etc. The custom of eating gingelly preparations when a girl attains her puberty is still in vogue. Such instances can be multiplied where the use of gingelly for food and other purposes is obligatory. Women need more calcium as they eliminate large quantities of it during menstruation.

In *Health Bulletin No. 23* (1938 Edition), the compositions of gingelly (*Sesamum indicum*) and soya bean are given as under:—

		Gingelly per 100 gms.	Soya bean per 100 gms.
Moisture	...	5.10	8.10
Protein	...	18.30	43.20
Fat	...	43.30	19.50
Mineral matter	...	5.20	4.60
Fibre	...	2.90	3.70
Carbohydrate	...	25.20	20.90
Calcium	...	1.45	0.24
Phosphorus	...	0.57	0.69
Iron mgs.	...	10.50	11.50
Calorific value	...	564	432
Vitamin A	...	107	710
,, B-1	...	—	300
,, B-2	...	—	++
,, C	...	0	—
Biological value	...	67	54

The figures for Vitamins B_1, B_2 etc., content of different amino-acids, minerals other than calcium, phosphorus and iron, acid-alkali balance, etc., have yet to be ascertained and recorded for gingelly and its oil-cake.

The calcium content of gingelly is six times that of soya bean, seven times that of Bengal gram with outer husk (*Circer arietinum*) and black gram dhal (*Phaseolus mungo*), and ten times that of red gram dhal (*Cajanus indicus*) and green gram with outer husk (*Phaseolus radiatus*). The calcium content of even Skim Milk Powder is slightly lower than that of gingelly seeds. No other food analysed and listed in *Health Bulletin No. 23*, except garlic, is so rich as gingelly in its calcium content.

The mineral content of gingelly is more

A SOYA BEAN FARM.

than that of pulses, nuts, cereals, leafy and non-leafy vegetables, fruits, and other natural foods listed in *Health Bulletin No. 23.*

The biological value of gingelly seeds is considerably higher than that of soya bean, green gram and black gram.

Whether the amino-acids contained in the proteins of gingelly oil-cake would satisfactorily provide those that are short or absent in the proteins of rice and other cereals, may have to be investigated. Experiments and feeding trials may have to be conducted to find out if and to what extent and in what form and proportion the gingelly seeds and or its oil-cake would enhance the nutritive value of a rice diet, which is devoid of calcium and markedly deficient in certain other nutritive constituents.

The question of gingelly or its oil-cake forming an item of daily food has, therefore, to be carefully studied scientifically by nutrition research scientists.

The gingelly oil-cake sold in the market is full of sand, mud, etc. It emits a bad smell. It is not, therefore, fit for consumption either for men or for cattle. Thorough cleaning of the seeds before crushing and to arrange for the marketing of clean, sweet, fresh cakes would be necessary to overcome this difficulty.

It is necessary that Government should cause investigations to be made in the directions indicated above.

Topics from Medical and Health Periodicals

Loss of Vitamin C Minimized in Boiling Vegetables

ALTHOUGH boiling vegetables reduces their vitamin C content, there are certain precautions that can be taken to make this loss as small as possible, Doris Mc Cary, Cedar Rapids, Iowa, points out in *Hygeia, The Health Magazine*. Here is her advice:

"Keep the vegetable refrigerated until ready to use. Then wash, pare and cut into pieces at the last moment. Avoid soaking in cold water. Small pieces are best since they allow heat to penetrate at once, rendering the oxidative enzyme inactive more quickly. Add salt to the water, to season the vegetable while it cooks. Use as small an amount of water as practical, about one-half a cup, or enough to cover the bottom of the pan. Use a tight lid. Cook until tender, drain and save the vegetable juice. Serve as soon as possible. *—Texas State Journal of Medicine, Aug. '41.*

Eating Ice

"MANY persons experience bowel cramps and gas in the abdomen when they eat or suck ice," *Hygeia, The Health Magazine* says in answer to an inquiry as to whether eating or sucking ice is injurious to the health. "Especially in hot weather, or after strenuous exercises, taking large amounts of any ice-cold liquid is not advisable. As long as no particular symptoms are observed the problem would seem to be one of personal taste. Some persons can tolerate moderate amounts of ice without harm."*—Texas State Journal of Medicine, Aug. 41.*

Diet and Life

ALTHOUGH it is true our life span has been increased, yet an analysis of that gain shows it is confined almost entirely to lower-age groups. Excluding infant mortality and the diseases of childhood, and excepting also our control of the major pestilences, the chances of dying after you reach thirty-five are about as great today as they were a hundred years ago. The human race still digs its own grave with its teeth . . . Your diet, what you eat, largely influences the rate at which your organism ages and consequently the duration of your life . . . Malnutrition, coupled with the conditions of modern life, makes us particularly subject to pathological decay.—*Dr. Victor Heiser in "You're the Doctor."—National Health Review, Oct. 1940.*

Milk and Nutrition

THE great value of milk is due to the high quality of its proteins, to its mineral contents and vitamins and to the easy digestibility of its proteins and fats. The proteins of milk are called caseinogen and lactalbumin which are needed for successful nutrition, and its carbohydrate is lactose or milk sugar, while its fat is suspended in the fluid in minute particles forming an emulsion. Milk fats are the most digestible of all fats. The bone-forming mineral constituents present in milk are phosphates of calcium and magnesium, and chloride of potassium. All these are required for the human body. The iron content of milk is, however, small.—*The Mysore Arogya.*

Properties of Ghee

BODY building on a nation wide scale requires the restoration of the old Indian dietary, rich in milk and ghee, pulses, meat, and fish. Ghee is very highly praised for its properties of improving the higher intellectual capacities, namely :

Smruti Mati Medha
Kanti Swara Lavanya
Soukumaryah
Ojas Tejo Balakaram
Ayushyam Vrushyam Medhyam
Vayastapanam.

Ghee is said to improve Memory, Wisdom, Genius or retentive power, Lustre of skin, Clearness of voice, Grace, Delicay, Biomotive power or vitality, Brightness, Strength, Long life, Sexual power, Purity of mind and body, and Establishment of youthful feeling.

Those who do not know about our Ghee' talk much of Codliver oil.

Gavyam Sarpih Gunottaram.

The ghee of the Cow is superior to any other ghee in improving all the above properties.—(*Journal of Ayurveda*).

Milk and Appetite

THE first thing taught in pediatrics is that every child is a law unto himself. The next fundamental taught in the past has been that every child should have a quart of milk a day. When the above statements are analyzed, it is at once apparent that they are definitely contradictory.

In the first place, the food needs of not two children are exactly the same. From the basis of body type, the linear, hypertensive child presents a food problem entirely different from the lazy, lateral body type of child. It is not uncommon to see twin children with different needs for food and caloric intake. It is as ridiculous to say that every child must have a quart of milk a day as it is to say that every horse needs a certain amount of feed each day. Any child knows that a Shetland pony and a Percheron have different food requirements.

The dosage of drugs is figured on the basis of a child's weight. Thus, if an average 15 months old baby is given one quart of milk a day, its equivalent for an average adult would be two gallons a day. Anyone who has been on an experimental milk diet of two gallons a day knows the complete loss of appetite that accompanies it.

One of the arguments presented for a large milk intake has been that it is an indispensable source of calcium in the diet. For the past six months I have been interested in the relation of urine calcium to blood calcium. In an article in the March 1940 number of the *Journal of Pediatrics*, Dr. Allen P. Bloxsom called attention to the clinical value of the very simple urine calcium studies on nursery babies with such interesting results, that I began doing the test routinely in all clinical cases. Recently, Dr. Lois Norman and I have analyzed 100 consecutive cases of children over one year of age in which both the history of the average daily milk intake as well as a routine urine calcium estimation was recorded. Of the 100 cases, 21 children had lower than average calcium content and 10 of these had no calcium precipitate at all in the urine. The milk intake in these 21 cases was from one pint to one quart in 16, and was eight ounces or below in only 5 cases. In the 100 case records, there were 11 children who drank no milk at all, and of these, 8 had normal amounts of calcium in the urine. I realize that this study was a purely clinical one on private office patients and needs more scientific observation and control before conclusions are drawn. But it does indicate that milk alone does not furnish the total source of available body calcium.

The next angle of this problem is to call attention to the relation between hunger and appetite. Aldrich in his delightful book ' Cultivation of the Child's Appetite" points out that hunger and appetite are entirely different. The former is a natural instinct, but the latter is an acquired characteristic. Hunger is painful and can be relieved by even small amounts of food, especially bulky foods like milk. Appetite is a cultivated characteristic, but its correct development must be by repeated stimulations from hunger. Thus we see that to develop an appetite, occasional hunger is essential. This is the reason the modern child is so likely to be a poor eater. The mother keeps the child so stuffed that he does not have an opportunity to develop an appetite.

With the preceding factors in mind, I have adopted the following routine in my cases of anorexia nervosa:

1. A very careful history is taken, including approximate food intake, milk consumption, attitude toward food, number of relatives, environment, habits of eating, and the relation fatigue may play.
2. A complete physical and laboratory examination is made, including a red blood count and urine calcium determination.
3. No milk is given for two weeks except the small amount used over cereals and desserts. Ice cream and milk drinks are stopped entirely.
4. I routinely caution the mother to expect no change in appetite for one week after the milk is discontinued. There is some change in the child's attitude toward food after the third day, but it is better to over-estimate rather than underestimate the child's reaction.
5. The mother is required to keep a food chart for the three days just prior to the return visit.
6. My usual prescription is for liver extract, and iron if there is an anemia, and calcium if the urine shows a calcium deficiency. I routinely give these children Vitamin B Complex.

SUMMARY:—1. It is an error to expect every child to drink a quart of milk a day.

2. A urine calcium estimation and a red blood count are necessary as routine procedures in cases of anorexia nervosa.

3. Elimination of milk as a beverage for two weeks changes the child's attitude toward food.—MAX R. WOODWARD, M.D., Sherman. —*Texas State Journal of Medicine*.

Nutrition of Children and Adults

REVIEWING a paper on the above subject by G.M. Brown, published in Amer. Journal Dis. of Children, Isabelo Concepcion M.D. writes in the *Phillippine Medl. Assocn. Journ. Aug. 41.* "The purpose of this paper is to correlate some of the observations on adults, both in health and disease, with the habits of nutrition formed early in life. Pediatricians, of course, have a full understanding of the importance of the proper nurishment of infants and young children. There has been little emphasis given to the importance of continued attention to the factors necessary to maintain the health of a person at the highest possible level from the time he begins to choose his own diet through the entire growing period and young adult life. One seldom finds a layman who has any concept of what constitutes a balanced diet for a human being. I feel sure that this ignorance is partly due to the lack of instruction given by the average physician. The majority of physicians have no definite concept themselves of what constitutes a normal balanced diet, and few have any brief method of explaining it to their patients so that a clear understanding is reached. A thorough education of physicians and of the lay public is needed.

1. The first and chief reason for dental caries is insufficient nourishment before birth because of a deficiency of calcium and vitamin D in the mothers' diet.

2. The second reason for dental caries in children is deficiency in the amount of vitamin D ingested during the entire growing period.

3. The real cause of pyorrhea is the lack of sufficient amounts of vitamins B and C in the diet. Infection would never start in the gingival margins if the gums were properly nourished at all times.

4. A child who is blessed with a good set of teeth in the beginning and who eats a diet that is properly balanced all his life will never need artificial teeth.

5. A person with a healthy set of teeth is usually healthy in every other way.

6. There is a lack of precise teaching, both of physicians and of the public, of the necessity for consuming a balanced diet at all times.

7. If sufficient attention were given to this subject and if properly balanced diet were consumed by the entire public during the full length of life, I believe that most of the painful chronic conditions of adults would be prevented.

8. To be healthy and comfortable during the last forty years of life, one must eat correctly during the first forty years.—*I. C.*

Eggs

EGGS are a valuable source of proteins. Eggs rank next to milk as a suitable food for growing children. The mineral elements of egg are, calcium, phosphorus, potassium, sodium, chlorine, sulphur, and iron.—*The Mysore Arogya.*

Preparation of Malted Starch

GOOD selected *cholam* with husk and not more than three months old will germinate up to at least 90%. Convenient lots of about 2 Madras measures are placed in a bucket and covered with clean drinking water up to say about six ins. from the top and stirred. The glumes and lighter seeds floating on the top should be removed and the remaining seeds after 4 to 5 hours soaking are drained free from water on a sieve or coarse cloth and aerated by repeated spreading for about half an hour. The seed is again soaked in water and separated for another half hour. These soakings and aeratings are repeated until germination is noticed. This may take about 30 to 40 hours. The grain is spread in a cool dark room, for slow germination with occasional sprinkling of water to keep up the growth of the radicles to a length of about ½ to ¾ inch. This takes about 4 to 5 days. Too rapid a growth is to be avoided by keeping the temperature low. The seed is then quickly sun-dried for a day or two until it is free from all moisture. The seeds are then fried at about 60 to 70 degrees centigrade to the stage when a fine aroma is noticed and then quickly rubbed on a gunny to remove all radicles. The grain is then sieved or minnemed and is now ready for grinding in an ordinary country stone mill. The husk is removed by sieving, minnoming and the fine powder is ready for use and can be preserved in a clean dry tin that can be well covered. As needed spoonfulls are made into a paste with hot water and then diluted with more hot water as desired. Additional filtration through cloth helps in removing traces of husk or big lumps. Very small quantities of milk give an added flavour and nutrition. Even without milk the food is well relished by infants. Such in brief is the process of making an infant food which even the *poorest can* follow. It must be emphasised that this is not even a third class quality food from the point of scientific feeding. It is only meant to replace the starch *cunjees* that will completely starve the poor unfortunate infant. Enough calories can be provided by this means to enable the young infant to drag its miserable existence to about the *sixth* month when it can hope to help itself to some body building food in the *form of vegetable purees.* Anybody who encourages this process among the poorest classes will earn the gratitude of a generation that was helped to survive from a condition which would have otherwise been certain death.—*Indian Medical Record.*

Quality in Rice

IT is generally held that rice is a poor article of diet and that it is not possible to alter its food value appreciably. It has even been suggested that rice should, in part at least, be substituted by some other cereal like wheat. But the poor quality of the rice, as ordinarily consumed, is largely traceable to the choice of wrong varieties, to refined conditions and to the prevalent practices of washing and cooking involving considerable losses of nutritive elements. Thus, although the fine-grained and white varieties of rice are generally favoured

by consumers, it has been found that some of the coarse and coloured varieties contain larger quantities of protein and mineral ingredients and possess thicker bran layers. Again, the losses in nutritive constituents as a result of washing prior to cooking of rice is not generally recognized and may be quite considerable especially when reckoned with the losses on polishing.

In the process of polishing of rice, more than half the mineral matter of the grain and a fourth of the protein are lost while the fats and vitamins are almost entirely removed. Polished rice has a pleasing appearance and texture, it cooks more easily than the unpolished grain and, it is believed, digests better; in the unpolished condition, it has far better keeping quality and can be stored for long periods or transported over long distances without appreciable deterioration.

In vitro digestibility trials have, however, shown that the difference in digestibility between unpolished and polished rice is too small to be of any significance in practice; it is possible by suitable control of humidity and storage methods to prevent or at any rate greatly minimize the deterioration of hullen rice on storage. On account of the thick bran layers, unpolished rice is no doubt somewhat slow to cook but this defect is more than compensated by the bigger return of shelled rice and by the fact that, bulk for bulk, cooked unpolished rice contains more soild matter and has far more sustenance than cooked, polished rice. The consumer will thus stand to gain not only in the quality but also in the quantity of available food material.

It is also possible, within limits, to increase the protein and mineral contents of the rice grain by cultural methods. Rice protein has a biological value higher than that of most other cereals including wheat and a large part of the phosphorus present in rice is also, according to recent evidence, available to the human system.

Parboiling of rice improves its food value in that even after milling, such rice retains more of the essential constituents than the corresponding raw rice. This has been shown to be due to the absorption of these constituents from the integuments by the endosperm and to the facts that commercial parboiled rice is usually undermilled and that, for parboiling, coarse rices are often used. Parboiling also results in a high increase in the yield of head rice on milling. Further more, parboiled rice has a better keeping quality than raw rice even in the unpolished condition. There is thus every reason to hope that the production and use of parboiled rice should become more extensive than has hitherto been the case.

There is great need for educating the public in regard to methods of improving the status of the rice diet and thus ensuring better growth and greater improvement in the general health and well-being of the rice-eating population of the world.—MR. A. SREENIVASAN, Indore.—*Calcutta Medical Journal.*

"WHY do you close your eyes every time you take drink?"

"My doctor said I must not look at liquor"
—*The Kemcol.*

Food Adulteration

FOOD adulteration in recent times has assumed alarming proportions. The Royal Commission on Agriculture, presided over by H. E. the Viceroy emphasised, twelve years ago, the necessity of controlling milk and milk products in the interest of health and well-being of the people. Subsequently, Dr. Wright, the special Dairy Expert who made a comprehensive survey of the Dairy Industries in India, wrote: "It is, I think, universally recognised that the prevalence of adulteration *constitutes one of the most urgent and difficult problems of milk distribution.*" (Italics ours). Conditions have not improved since then, rather we should say, deteriorated; for the evil has spread from cities even to remote villages, and constitutes a major problem of public health. Official efforts to control the abuse have not succeeded to any large extent and fraudulent tradesmen have shifted their field of operations to villages and small towns where no check exists over adulteration. And even in centres where the Adulteration Act is operative, adulteration of foodstuff, particularly milk and milk products, shows no signs of abating, and in certain cities it is definitely on the increase. Private effort therefore, to co-operate with Governmental efforts for the prevention of adulteration in milk, butter and ghee which has of late been in evidence, indicates how wide-spread are the ramifications of this evil and is welcome as an encouraging sign of increasing public interest in this national problem. But in the existing times in which we are now living with war waging fiercely and with acute political unrest in our own country, it may seem to some as an unpardonable crime for any one to seriously discuss a prosaic problem as adulteration of milk; but not much argument is necessary to show that a check in food adulteration must assist nutrition and benefit public health. From this point of view, the All India Conference which met at Delhi the other day under the presidentship of Mr. Shanti Das Askoran, Member, Council of State, is welcome. With the general conclusions arrived at the Conference and the recommendations we find ourselves in agreement. More frequent prosecutions with heavy sentences should prove an effective deterrent. In view of a widespread use of skim milk powder for purposes of adulteration, Government might well consider the desirability of reimposing the import duty on this product. Other feasible measures of preventing adulteration that may be considered will be in the direction of enforcing official grades in certain foodstuffs and the provision of an effective anti-adulteration staff compulsory in the case of the larger Municipalities and Local Bodies.—*Dharmarajya, 6-5-41.*

Acknowledgment

The articles entitled 'EMOTIONAL DISTURBANCES' by Carl Binger, Esq. and 'MUSIC AS MEDICINE' by Edward Podolsky Esq., published in our Nov. '41 issue of *Health* have been extracted from *Hygeia* and *Illinois Medical Journal* respectively—which, through oversight, we had failed to acknowledge in that issue. The error is regretted.—EDITORS.